

REMARKS

In response to the office action of October 14, 2005, please amend the above-identified application. Please amend claims 1, 24-32, 34, 35, 39, and 41. Please cancel
5 Claim 43. Claims 42 and 44 were previously withdrawn.

Claims 1, 2, and 24-32 were objected to because of the manner in which various process steps are given one of the following identifiers; “-reaction step-“, “-removal step-“, and “ -cleaning step-“

The identifiers in these claims have been removed.

10 **Claim 34 was objected to because “hydrogenperoxyde” should be “-hydrogen peroxide-“.**

Claim 34 has been amended and the reason for the objection is now obviated.

Claim 43 is objected to under 37 CFR 1.75 as being substantial duplicate of claim 41.

15 Claim 43 has been cancelled.

Claims 35, 36, 38, 39, 41, and 43 are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim subject matter which applicant regards as the invention.

20 Claims 35, 39, and 41 have been amended. Claims 36 and 38 are dependent on claims 35 and 37, respectively. Claim 43 has been canceled.

Claims 38 and 39 recite the limitation “ said electron beam generating electron beam column.” There is insufficient antecedent basis for this limitation in the claim.

Claim 39 has been amended to obviate the reason for this rejection. Claim 38 has not been amended for the reason that it does not contain this phrase.

5 **Claims 41 and 43 recite the limitation “ the multi-jet supply...” There is insufficient antecedent basis for this limitation in the claim.**

Claim 41 has been amended to obviate the reason for this rejection.

The phrases “ high current density” and “being well focused” in claim 35 are relative phrases which renders the claim indefinite.

10 Claim 35 has been amended to obviate the reason for this rejection. Applicant respectfully suggest that the specification does provide a standard for ascertaining the requisite degree.

Claims 1-3, 19-41, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,677, 586 issued to Nasser-Ghodsi et al. (hereinafter, Nasser-Ghodsi) in view of US Patent 6,387, 530 issued to Lui et al. (hereinafter, Lui).

15 Nasser-Ghodsi teaches an electron beam induced chemical etching process which includes repetitive steps and comparison of secondary electron emissions to determine different materials. The information learned from the Nasser-Ghodsi invention is then utilized in the manufacturing processes in real time to make adjustments in the manufacture
20 of the integrated circuits. The instant invention is directed toward the repair and

modification of ever-smaller devices including masks and integrated circuits as well as many other devices. Precision is necessary in the repair and modification of these devices. Claim 1 of applicants invention includes a first step where the material which is to be etched is irradiated with a first electron beam and a beam of molecules is activated by the first beam of electrons. The activated reaction product is then removed in the second step by locally heating the activated reaction product to a temperature above the vaporization temperature by a second beam of electrons. Table 2 in the specification and paragraph 64 of the specification provide antecedent basis and support for claim 1.

Nasser -Ghodsii et al. is directed toward and discloses measuring secondary electron emissions as a way of determining that the material has been sufficiently etched to reach a different material exhibiting a different secondary electron emission. The Primary Examiner is correct in his observation that Nasser-Ghodsii utilizes a laser beam to vaporize reaction products and that applicants' invention utilizes a second electron beam. The difference between the laser and the second electron beam is not trivial. Applicants use a highly focused high power electron pulse which thermally heats the reaction product to drive these molecules off the surface through vaporization. See, paragraph 57 of applicants' specification. Further, applicants specification states that all photon beam based processing suffers from a *limited resolution* which, in turn, limits the processing of the substrate or workpiece to be prepared. See, applicants specification, paragraph 0008. The undersigned realizes that claim 1 of applicants patent application does not recite the

second electron beam as requiring it to be a highly focused high power electron pulse with attendant numerical parameters but such limitations are not believed to be required as claim 1 is believed to be patentable in its present form given the inherent difference between a laser beam and an electron beam.

5 Further, given the inherent differences in these beams it is respectfully suggested that the citation of the '530 patent to Liu is inappropriate as it does not provide the required suggestion or motivation to modify Nasser-Ghodsi to arrive at the claimed invention.

Liu discloses using thermal energy beams such as lasers, electron beams, etc. to produce a phase transformation in a media for data storage. The reference to electron
10 beams in Liu appears to be incidental. Liu does not speak in terms of vaporization of reaction components rather it speaks in terms of phase transformation and crystallization of a substrate. Therefore, in Liu nothing is being removed and it would take a leap of logic that a person of ordinary skill in the art of mask repair, for example, would look to the art of magnetic media and phase transformation of media and combine it with the art of
15 inspection and manufacturing processes for integrated circuits as taught by Nasser-Ghodsi to arrive at the invention as claimed in claim1.

Neither Nasser-Ghodsi nor Liu provides any teaching or motivation to arrive at the instant invention as claimed. MPEP section 2143.01 indicates that the prior art must suggest the desirability of the claimed invention. Nasser-Ghodsi is a method of inspecting
20 integrated circuits and Liu is directed toward producing high areal storage density magnetic

media. Nasser-Ghodsi is classified in US Class/Subclass (250/310) entitled radiant energy/
electron probe type. Liu is classified in US Class/Subclass (428/559) entitled stock material
or misc. articles/particles discontinuous. “Obviousness can only be established by
combining or modifying the teachings of the prior art to produce the claimed invention
5 where there is some teaching, suggestion, or motivation to do so found either explicitly or
implicitly in the references themselves or in the knowledge generally available to one of
ordinary skill in the art. ‘The test for an implicit showing is what the combined teachings,
knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as
a whole would have suggested to those of ordinary skill in the art.’ Here, it is respectfully
10 suggested that the Examiner is improperly combining the references.

The problem to be solved by the Nasser-Ghodsi reference (inspection at different
depths into a substrate) is totally different from the problem to be solved by the Liu
reference (magnetic pattern deposition). Further, the problem to be solved by applicants’
invention, to wit, a need for high spatial resolution for repair and modification of surfaces
15 for ever-smaller devices is considerably different from the two cited references. The
references themselves do not explicitly provide any suggestion or motivation for combining
the references. Nor can any suggestion or motivation be implicitly found since the
references are structurally and procedurally different from the instant invention and they are
each directed toward solving different problems using different technology.

20 In *In re Kotzab*, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000) the court held that a

“finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of [the claimed invention] to make the combination in the manner claimed” must be made. In the instant application, the Examiner has not identified a specific understanding or principle within the knowledge of the skilled artisan that would have motivated one with no knowledge of the claimed invention to make the combination in the manner claimed.

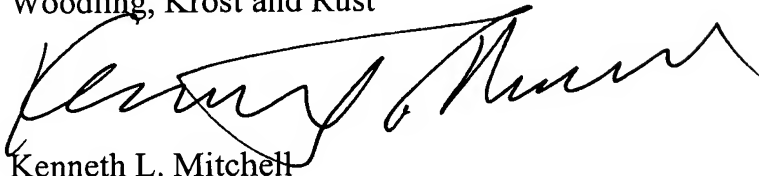
Reconsideration of claims 1-3 and 19-41 is respectfully requested.

The undersigned invites a telephone call from the Examiner if it would expedite the processing and examination of the application.

If there are any additional charges, or any overpayment, in connection with the filing of the amendment, the Commissioner is hereby authorized to charge any such deficiency, or credit any such overpayment, to Deposit Account No. 23-3060.

Respectfully submitted,

Woodling, Krost and Rust



Kenneth L. Mitchell
Patent Attorney, 36873
Registered Professional Engineer
Karl Kurple
Patent Agent, 57,440
Woodling, Krost and Rust
9213 Chillicothe Road
Kirtland, Ohio 44094

phone nos. 440-256-4150;
fax nos. 440-256-7453;
cell no. 440-487-2694
clevepat@aol.com